

Industrial Clusters in Al-Hassan Industrial Estate Study in Economic Geography

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ABSTRACT

The industrial estates represent the most prominent forms of support provided by the state to the industrial sector by achieving external savings that support the establishment and continuation of industries. The successive Jordanian governments seek to support the industrial sector and provide it with all forms of incentives in order to improve the growth of the Jordanian economy and providing job opportunities. Therefore, they established (6) industrial estates distributed all over the Kingdom's governorates. However, these industrial clusters are still working within the classic classical conception of clustering, as a place for grouping industries, and were unable to switch to the concept of industrial clusters resulting from interaction and integration between industries, while the industrial clusters turned to be a development strategy leading to the growth and development of industries. So, this study aimed to find out if the industries in the Industrial City of Al-Hassan Industrial managed to shift from the traditional concept of clustering to the concept of cluster, and to know the reasons preventing this transformation. The study adopted the descriptive analytical approach and the qualitative analysis of the data collected through the study tool (the questionnaire). The study concluded that the industries in Al-Hassan Industrial City were unable to transform into a cluster based on interaction and exchange, and the interaction between factories and the local community represented by academic institutions is at its lowest levels. Therefore, the study recommends restructuring the industrial estates and technology areas in the Kingdom to shift from the traditional role of the industrial cluster to the modern concept.

Key words: Al-Hassan Industrial City, economies of scale, external savings, intermediate industries , industrial cluster,

INTRODUCTION

The ideas of Alfred Weber, arose at the beginning of the twentieth century and specifically in 1909, are the beginning of the economic geography focus on the importance of industrial clustering as one of the main factors in choosing the ideal location for a single plant, so industrial clusters are formed

due to geographical proximity where economics of scale and economic of scope are achieved leading to the achievement of tangible and intangible savings, and allowing exchange of information. Interactions in the industrial grouping are the secret of the grouping success, and they have a higher capacity to exchange goods and services, and allow companies to access information through cooperation and competitiveness, and cooperate to solve problems, share inputs, and this is not available for independent companies. Given the importance of industrial clusters in bringing about real development, many countries have supported the "industrial clusters strategy" whether to support regional development or national development based on supporting the industrial sector, and the establishment of industrial clusters in Jordan began in 1980 by establishing the Industrial City in Sahab, then Al-Hassan Industrial Estate in Irbid in 1986. (Table No. 1) Also the Industrial Estates Commission is currently establishing other four estates in Madaba, Salt, Jarash and Tafileh.

Table No. 1: Industrial cities in Jordan

Industrial City	Location	Number of operating factories	Number of Labourer	The size of the investment / million dinars	Exports / million dinars
Abdullah II Industrial City	East of Amman	467	15675	1395	419
Al-Hassan Industrial City	Irbid	150	31796	485	493
The city of Hussein bin Abdullah II	Karak	39	4114	47	109
Aqaba Industrial City	Aqaba	117	2100	426	320
Al Muwaqqar Industrial City	Amman	93	3263	471	65
Mafraq Industrial City	Mafraq	3	16	.400	----

Source: Industrial Cities Administration, Strategic Plan, 2017. Department of Statistics, 2019.

Since the middle of the twentieth century, the Jordanian industrial strategy has taken a form to support the local industry and protect it from external competition. This policy continued until the end of the eighties of the twentieth century. This policy supported the industrial sector and the development of substitutional industries through customs protection, but this inward orientated industrialization policy did not enable the industrial sector to compete abroad, as the industrial sector continued to meet the basic needs of citizens. Due to the absence of the competition factor, the local industries did not develop their products.

In the eighties of the twentieth century, the industrial policy shifted from protection to the policy of exporting and opening to the outward oriented industrialization, and Jordanian industries experienced a shock it responded to it slowly. It became necessary for the industry to keep able to compete after stopping the forms of protection provided by the state.

The successive industrial policies tried to distribute industries to the various governorates of the Kingdom in order to distribute development gains and achieve the desired regional development. Therefore, they established industrial estates in most of the governorates of the Kingdom despite the lack of industrial settlement factors in these governorates. They also worked on many financial support measures, industrial lending institutions and provision of industrial infrastructure. Therefore, the government support programs support industries to increase their productivity but they do not focus on networking and interaction between industries.

Thus, the industrial estates were only a geographic / spatial grouping of a number of industries that were established in a spatial space, and were unable to interconnect with each other or interact or take advantage of the advantages of the grouping in creating economics of scope. The industrial clusters or Marshall pool refer to a group of specialized factories that have complex relationships are able to reduce production and transportation costs and can access skilled workers, knowledge and technology.

However, Jordanian industrial estates operate according to the traditional pattern of industrial clusters, known as Pure Agglomeration as it includes individual factories and does not attract high-tech factories.

Given the importance of industrial clusters and their role in supporting the Jordanian economy, it becomes necessary to know whether these clusters are still linked with vertical and horizontal complementary relationships, and the ability of these clusters to attract creative industries that stimulate local development, and know the reasons preventing the building of a cluster.

FIRST: THE THEORETICAL FRAMEWORK OF THE STUDY

Study problem

Industrial clusters constitute one of the most prominent incentives provided by the state to support the establishment of industries where industries gather in one place, which achieves external savings, which in turn reduces production costs, known as economies of scale. The Industrial City in Amman was established in 1986 and it has about (367) factories. (Industrial Estates Corporation, Annual Report, 2018). This study will attempt to find out whether these factories achieve industrial interconnections to form a cluster between integrated and interconnected industries and find out the reasons preventing transformation of the traditional industrial clusters into interconnected groupings (clusters)?

Objectives of the study

This study seeks to answer the following question:

Do industries in **Al-Hassan Industrial Estate** enjoy the characteristics of the industrial cluster, or they are still within the traditional concept of industrial clusters?

Study methodology

The study will adopt the descriptive analytical approach to analyze the data and information collected through the study tool (the questionnaire) and interviews with factory managers. The data will be analyzed quantitatively and qualitatively.

SECOND: PREVIOUS STUDIES

Despite the novelty of the Industrial Clusters concept, many studies addressed it from several angles. Among the most recent of studies is the study (Barham, 2015) that aimed to discuss the possibility of building cluster industrial groupings by studying the existing engineering industries in the city of King Abdullah II in Jordan. The study suggested in its theoretical and field aspects that there is no cluster industrial grouping in its concept that reflects the formula of interaction and cooperation between the actors (influencers) in the industrial sector in general and in the engineering industries sector in particular. He explained the failure of establishing cluster industrial groupings in three trends:

- **The structural trend:** the industrial leadership that can be built upon is almost non-existent, and the research and development sector is still far away.
- **Social trend:** The weakness of interconnections and interactions between factories negatively affected the relationships between businessmen, (53%) of them reported that they do not discuss issues related to their industry with others, so their industries are only limitedly integrated.
- **The formal institutional trend:** The industrial clusters suffer from the lack of programs to establish clusters and the universities and scientific research deanships were unable to interact with Jordanian industry or make a qualitative change in its structure.

The study (Mohammad, 2015) aimed to highlight the importance of industrial clusters in solving problems facing small and medium enterprises, and adopted a descriptive deductive analysis method. The researcher concluded that Algeria did not adopt the industrial clusters strategy, but the Algerian economy presents many areas that can represent a field to develop clusters or industrial clusters. To activate the industrial clusters strategy, it is necessary to provide methods of network work for the production units and governmental and transformative institutions and others in the process of supporting competitiveness. In addition, the small and medium enterprises must realize the importance of the cluster and its advantages.

(Zarkin, 2014) study aimed to clarify the role and importance of industrial clusters in achieving the competitive advantage of small and medium enterprises that help in reducing the risks of competition with imported products in the Algerian markets. The study adopted the descriptive analytical approach and the inductive approach, and concluded that the strategy of industrial clusters is based on mutual trust and good faith among other institutions. Exaggeration in administrative complications and conditions for obtaining financing made it difficult to build industrial clusters despite their importance in reducing production costs and supporting technological and innovative development of enterprises. The study recommended the necessity of defining a geographical map that shows the regions and the most important projects or areas that can be taken care of in each region and have a comparative advantage or link to the environment and resources available in each region, where due consideration is given to the establishment of small and medium enterprises and trying to link them to each other by adopting the idea of industrial clusters.

(Maggioni, 2004) study addressed the cycle of industrial clusters. With the spread of high, medium and low technological innovations, new industrial clusters appear on the account of traditional industrial clusters. The industrial clusters go through three stages, the first stage where development spreads due to external factors and can achieve profits because of the location. The second stage is the stage of the Marshall Economic Community (1909) in which the labor market is grouped and the intermediate goods and services and knowledge are provided. These clusters played a role in preserving start-up companies by achieving profits from the advantages provided by the location. In the third stage, the industrial cluster either leads to local and international development, spreads knowledge and flexibility, and becomes able to withstand technological shocks, or it diminishes socially and economically, as its diminish leads to successive migrations and high rates of unemployment.

Aya and Siddhathan (2007) study addressed the industrial clusters in India. It aimed to analyze the industrial clusters of some manufacturing industries, and focused on the automotive sector. It addressed and analyzed the factors that led to the emergence of automotive industry clusters in Chennai and the national capital. The study also compares industries which appear and grow in industrial clusters, and those that originate outside industrial clusters. The study concluded that the Indian industrial clusters are concentrated in three regions: the national capital, Mumbai-Pune, and Chennai-Bangalore region, where industries vary in them. The factors that led to the emergence of these clusters are different due to the historical development and the political circumstances in which the bloc originated.

The current study seeks to analyze industrial clusters according to the concept of modern economic geography in Jordan, i.e. in terms of the industrial cluster concept, and will move away from the classic concept of industrial clustering, and linking the characteristics of the industrial cluster with the possibilities of industrial development in the region.

THIRD: INDUSTRIAL CLUSTERS: EVOLUTION OF CONCEPT AND IMPORTANCE

Enterprises tend to concentrate in a location when their fixed costs are high, and for the production to be economically feasible, these enterprises follow production system based on what is known as "economic of scale" which means reducing the production unit cost by increasing the total production volume. This requires concentration in a specific location and not to spread the production units to reduce costs. (Barham, 2015, pp. 1600 quoted from Krugman, 1991). Therefore, countries were keen to establish industrial estates or industrial clusters to concentrate industries in them, and to benefit from the location or external savings, but the industrial clusters whose idea emerged in 1909 moved from traditional or classic industrial clustering to cluster industrial grouping or industrial cluster.

While the industrial cluster means: industries concentration in a specific area to take advantage of the infrastructure, overhead and logistical services provided by the location, they may not be associated with each other in any relationships, integration or production of intermediate materials, while the industrial cluster is an advanced and mature stage in industrial clusters and the industrial clusters are considered the most mature form of integrative work among enterprises operating in a certain economy. While there can be other forms of industrial clusters that substantially constitute a potential cluster a Potential Cluster, the clusters which are practically considered the most important to policy makers in developing countries. Knowing what might be a cluster and studying the conditions surrounding it will actively contribute in guiding development policies to stimulate it to move to a mature cluster. (Abdul Salam, p. 10) The international and Arab literatures explain the definition of the industrial cluster. (For more information, see Mohammad, 2015, p. 7, Barham, 2015, p. 1599, Ketels, 2003, p 3 and Porter, 1990).

Barham defined, according to Porter, the cluster grouping as: the concentration of similar production economic enterprises linked to a specific added value chain in a location and interact with similar production enterprises and linked to specialized suppliers and related enterprises institutions such as universities, unions and specialized services such as banks, accountants and consultants. (Barham, 2015, p. 1601)

In fact, the concept of industrial clusters began to take shape in 1990 when Michael Porter published his famous book "The Competitive Advantage of Nations" where he analyzed and studied models of industrial projects in ten industrialized countries and noticed a network of horizontal and vertical relationships between these projects. (Porter, 1990, p. 15) He concluded that the best environment for investments is the environment of industrial clusters, which he defined as: an economic phenomenon based on competition and cooperation between institutions to obtain certain economic advantages.

Schmitz defined the industrial clusters as: A grouping that includes a group of institutions having common factors such as the use of similar technology, participation in the same marketing channels, or benefit from a common employment center, or even a link by front and back relations between them. This grouping also includes a group of institutions associated with and supportive to it whose existence is considered necessary to enhance the competitiveness of the members of the cluster such as small and medium-sized enterprise groups. (Schmitz, 1992, P. 64) Based on this definition, there are two main types of industrial clusters:

- Vertically integrated clusters made up of industries that are connected through the buyer / seller relationship.
- Horizontally integrated clusters consisting of industries that can share in the public markets for the final products, and use similar technology or similar workforce skills or need identical natural resources. (Doeringer, 1995, P. 37)

The concept of the cluster is considered a dynamic, moving, and not static concept where it contains a series of internal and external relationships and influences that increase the technological diversity of the region and continuous development and grow of the cluster. (Oyelaran and McCormick, 2007, P. 19) The leading entrepreneurial companies in the management and use of technology are the driving force in this cluster. This dynamic and unstoppable process is an important source of the emergence of high production horizons in the technological applications. It is worth noting that organized dynamics depends not only on the expansion of production factors, but also on the development of productive capacities and the interaction of these capabilities with new opportunities in the markets, which constantly lead to the development of new products that in turn lead to reshaping markets. (Abdul Salam, P. 10)

Industrial clusters contribute to encouraging innovation through frequent interactions and information flow (Antonell, 1999). Concentration in a single geographical location provides suppliers and customers with appropriate feedback for innovations. These advantages support the survival and growth of companies. The spatial proximity provides a competitive advantage for companies that have complex interconnections with customers, suppliers and other institutions. (Porter, 1990)

Some researchers studied the role of artificial clusters in creating knowledge through face-to-face interactions, and creation of common language. Geographers proposed studying industrial clusters within a knowledge organization rather than studying transportation costs. (Spender, 1998, P. 43).

FOURTH: THE RESULTS OF THE STUDY

By analyzing the answers obtained through the study questionnaire, as well as through interviews with factory managers, the study concluded a number of important results, which we display as follows:

1. Absence of a industrial cluster based on interaction, exchange and cooperation between the existing industries in Al-Hassan Industrial Estate. The industries, totaling (8) industries don't have production or intermediate materials industry supply relation. The factories are independent entities operating in one place only, i.e. within the classic traditional concept of industrial cluster. Most investors expressed their desire to provide some production inputs from the factories located in the cluster, but the fear that these factories will not be able to provide the right amount and time hinder the establishment of this network. Despite the savings that could be achieved through this networking, the losses may be greater if marketing requirements are not met, which will result in losses in consumer confidence.
2. The existing industries in the Industrial Estate do not achieve any significant benefits from their presence in this cluster. The reason for setting up the factory inside the Industrial Estate is that the law of the Ministry of Trade and Industry does not allow establishing the factory outside the Estate, so investors are obliged to establish their factories inside the Estate. This opinion is supported by not losing anything when moving outside the cluster, and some expressed their desire to move outside the cluster, and that in case of moving he will achieve more profits. The industrial cluster provided the land and infrastructure only, which suffers from deficiencies in some aspects. However, (31%) of investors have optimistic view for the future. Upon the cluster expansion completion, they might be able to attract many diverse and vital industries. The cluster managed to attract (20) Syrian companies who preferred to move to Jordan after the events of the Syrian revolution.
3. The industries depend on external sources in supplying parts of the product in spite of the high costs, and despite the possibility of non-continuity of supply. Therefore, (54%) of the respondents expressed the need to search for internal sources (inside the cluster) for the supply, and that this policy constitutes a future strategy for the factory, while (46%) of the respondents believe that the link with external sources of supply made it possible to provide parts of the product at an appropriate time, and in spite of the high costs, it is an appropriate alternative to internal sources and an alternative to establishing a research and development unit in the factory.

This situation was reflected on the future development potential as only (4) factories plan to establish future projects while the remaining factories do not think of establishing projects in the Industrial Estate.

About (92%) of the factories in the Industrial Estate do not have research and development unit, and this is due to the following reasons:

- The high cost of establishing a research and development unit, and the equipment, experts, and engineers required for it.
- The factories do not need such unit. The industries in the cluster are simple industries that assemble the parts of the product, meaning that they are in the final stage without the product, and they depend on advanced technology that already exists.

The Industrial Estate was not able to attract creative technological industries, and its production operations start from the beginning of the industrial chain. The innovation stage marks the beginning of this chain.

1. All factories of the Industrial Estate are not linked together through a team or a joint maintenance unit, despite the savings that can be achieved by participating in such a unit. The reason for this is attributed to the nature of the factory's establishment, as the factory was established in the industrial cluster according to the system of the Ministry of Trade and Industry, and not as an attraction factor from similar factories in the product. In addition, the weak social relations between the factory owners were reflected in the interconnection and interaction between the factories. About (42) % of the factory owners do not have social relations with the rest of the factories, and about (36%) have social relations only and they do not discuss matters related to work or the product. The remaining (22%) discusses existing issues in the Industrial Estate such as obstacles and problems facing them in the Industrial Estate, but not matters related to the production process.
2. With regard to the interaction and cooperation between the factories and the management of industrial estates, it is at its lowest levels. About (89%) of the factories reported that they do not receive consultations or training courses for workers from the Commission, and that the Commission's role is limited to providing the place and legal framework to establish the factories, which confirms the traditional clusters and their inability to transform into a strategy for development in the region.

The President of the Investors Association in the cluster reported that not meeting was held during the last four years between the factories' representatives and any official from the Ministry of Industry or the Ministry of Investment. (President of the Investors Association, 2019). A factory of about (3500) workers in the cluster closed down this year, and it did not receive any help or advice from any government agency, and another factory will close down within days.

1. Cooperation and interaction with academic and research institutions in society is one of the characteristics of industrial clusters. The city of Irbid has Yarmouk University, University of Science and Technology and Al-Balqa Applied University, all of which have scientific and engineering colleges and pharmacy colleges, but the factories do not have any relationship with these colleges or their professors. (84%) of the factories rejected the idea of signing a cooperation agreement with these colleges because they are not convinced of their benefit, or because they are afraid of additional costs that might be incurred, which puts us in front of a (trust) crisis that prevails in the developing societies. The factory owners don't see a successful model for cooperation with academic institutions that achieves economic savings for them as investors, and such agreements transform the factory overtime into a student training incubator only.

The universities were not able to turn into creative research cells whose researches and projects contribute to the development of the productive and productive processes. The material and moral fences still prevent the integration of universities in our Arab societies with the local community and its development dilemmas for the reasons shown in Table 2.

Table 2: Reasons of non-integration of universities with the developmental dilemmas of society from the viewpoint of factory owners

Reason		
Poor coordination between the industrial sector and universities	32	76%
Lack of legislation regulating relations between the two parties	38	90.5%
Work bureaucracy of both parties	40	95%
Universities failure to market their research outputs and their inability to convince the industry sector of the importance of their role in developing the production process and product	36	85.7%

Source: Field survey and personal interviews, 2019.

Therefore, investors believe that universities should direct their staff to conduct qualitative, applied and development research that can be used to increase production, direct graduate studies to solve problems of the productive and service sectors, and develop laboratories and mechanisms used in production.

As for universities academics, about (92%) think that the weak cooperation between the two parties is due to the lack of a system of incentives and rewards, which is consistent with global statistics that indicate that private companies in industrialized countries contribute to (46% - 60%) of the total expenditures on scientific research, while this percentage reaches (12%) in the Arab World (WIPO, 2007). All academics reported that the faculty member's rights and gains must be specified in the patent and intellectual property rights. Therefore, research units specializing in factories and the representation of universities in the field of management for industrial enterprises and companies. In a study (WIPO, 2007), it is noticed that the industrial enterprises obtain profits against these procedures because every single dollar invested in research in the fields of industry in the United States of America gave a return of approximately (140) dollars.

From the previous presentation, it is clear that the industrial cluster in Al-Hassan Industrial Estate is a traditional cluster in its classic concept which means gathering industries in one place away from residential areas, and providing the legal framework for establishing factories and providing logistical services. Therefore, the factories were established individually in the Industrial Estate, and they were unable to transform into an industrial cluster capable of creating interaction, cooperation and mutual influence between factories and supply of intermediate products, and to shift to a strategy for development in the region.

RECOMMENDATIONS

Based on the previous results, the study recommends the following:

1. It is necessary to restructure the industrial estates administration in the Kingdom to shift from the traditional role to the modern concept of industrial clusters.
2. To focus on supporting interconnected industries through training courses and creating cooperation channels between them.
3. The academic and research institutions in the local community must play their role in developing the industrial sector, and these factories become creative cells for university students.

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